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determines the resulting updated control signal values for the given sector. These updated control signal values are used until the control values are recalculated during a subsequent study period. With the present invention, measurements include accumulated peg counts determined by call processing (service measurements and call processing failures). --

IN THE CLAIMS

Please cancel Claims 6 and 16. ✓ ✓

Please amend Claims 1, 7, 10, 13, 14, 15, 17 and 18 as follows:

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1. (Amended) A wireless communications system supporting a call with a mobile subscriber unit that is located within a sector of a cell of said wireless communications system, said sector containing a sub-sector, said wireless communications system containing a base station communicating with said mobile subscriber unit through a base station antenna for supporting said call, said wireless communications system comprising:
- means for detecting an occurrence of a call event type associated with said call;
 - means, responsive to said detecting means, for determining an approximate location of said mobile subscriber unit at the occurrence of said call event type;
 - means, responsive to said determining means, for mapping said approximate location to said sub-sector of said sector;
 - means, responsive to said mapping means, for incrementing a corresponding event counter that is associated with said call event type and said sub-sector; said corresponding event counter determining a performance metric associated with said sub-sector;
 - means, responsive to said incrementing means, for accumulating said corresponding event counter during a study period; and
 - means, responsive to said accumulating means, for adjusting a radiation pattern of said base station antenna by coupling control signals to said base station in order to

provide an improvement of said performance metric determined by said corresponding event counter.

Sub B1
7. (Amended) The wireless communications system of claim 1 wherein a second performance metric is associated with a second sub-sector and wherein said adjusting means comprises:

means for calculating updated values of said control signals to provide said improvement of said performance metric;

means, responsive to said calculating means, for modifying said updated values in order to limit a degradation of said second performance metric; and

means, responsive to said modifying means, for adjusting said radiation pattern of said base station antenna with said updated values.

Sub B1
10. (Amended) The wireless communications system of claim 1 wherein a second performance metric is associated with a second sub-sector and wherein said adjusting means comprises:

means for assessing whether said second performance metric is degraded more than a predetermined limit;

means, responsive to said assessing means, for calculating incremental values of said control signals to provide said improvement of said performance metric; and

means, responsive to said calculating means, for adjusting said radiation pattern of said base station antenna with said incremental values.

13. (Amended) The wireless communications system of claim 1 wherein said base station antenna is a linear array antenna.

Sub B1 14. (Amended) The wireless communications system of claim 1 wherein said base station antenna comprises a plurality of sub-sectors, each sub-sector associated with a narrow beam radiation pattern.

15. (Amended) A method for supporting a call for a mobile subscriber unit that is located within a sector of a cell of a wireless communications system, said sector containing a sub-sector, said wireless system containing a base station communicating with said mobile subscriber unit through a base station antenna for supporting said call, said method comprising the steps of:

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detecting an occurrence of a call event type associated with said call;
determining an approximate location of said mobile subscriber unit at said occurrence of said call event type, responsive to said step of detecting;
mapping said approximate location to a sub-sector, responsive to said step of determining;
incrementing a corresponding event counter that is associated with said call event type and said sub-sector responsive to said step of mapping; said corresponding event counter determining a performance metric associated with said sub-sector;
accumulating said corresponding event counter during a study period responsive to said step of incrementing; and
adjusting a radiation pattern of said base station antenna by coupling control signals to said base station antenna in order to provide an improvement of said performance metric, responsive to said step of accumulating.

Sub B1 17. (Amended) The method of claim 15, wherein a second performance metric is associated with a second sub-sector and wherein said step of adjusting comprises:
calculating updated values of said control signals to provide said improvement of said performance metric;

modifying said updated values of said control signals in order to limit a degradation of said second performance metric, responsive to said step of calculating; and

adjusting said radiation pattern of said base station antenna with said updated values, responsive to said step of modifying.

18. (Amended) The method of claim 15, wherein a second performance metric is associated with a second sub-sector and wherein said step of adjusting comprises:

determining whether said second performance metric is degraded more than a predetermined limit;

calculating incremental values of said control signals to provide said improvement of said performance metric, responsive to said step of determining, and

adjusting said radiation pattern of said antenna with said incremental values, responsive to said step of calculating.

REMARKS

Applicants thank the Examiner for his thorough and timely Official Action. Applicants have amended the Specification as indicated above to correct a typographical error that was discovered while reviewing the Specification in preparing this Amendment.

Applicant, by this Amendment, has canceled Claims 6 and 16 and has amended the remaining Claims to overcome all deficiencies noted in the Examiner's Official Action. Claims 1 - 5, 7 - 15 and 17 - 18 remain in this Application after entry of this Amendment.

In the Official Action, the Examiner presumed that the subject matter of the various claims was commonly owned at the time any inventions covered in the Application were made. The Examiner continued, pointing out the obligation under 37 C.F.R. 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made.

Bruckert (U.S. Patent 5,596,333). Further, Applicants respectfully disagree that Tayloe only differs from the claimed invention in that the sector also includes sub-sectors. Tayloe is prior art that is related to the area of technology addressed by the present invention. That is precisely why Tayloe was cited by the Applicants in an Information Disclosure Statement (IDS) in this prosecution. A significant distinction of the present invention over Tayloe is that Tayloe discloses altering various system-level parameters (emphasis provided) to achieve improved performance in a wireless communication system. Tayloe does not teach, show, disclose, suggest, infer or in any way render obvious the altering of a radiation pattern of a base station antenna in a wireless communication system to improve performance on a sub-sector basis.

Specifically, Tayloe mentions altering "...various system parameters such as: transmitter power, transmitter frequency, frequency assignments, or software algorithms." [Tayloe, Col. 5, lines 35 – 37]. The limitations of Tayloe are further enumerated by Tayloe: "Hardware specific alterations like: increasing or decreasing antenna height, adding additional base stations, utilizing omni or directional antennae, or varying antenna shaping must be performed in the field." (emphasis provided) [Tayloe, Col. 5, lines 55 – 59]

The adjusting of radiation patterns disclosed and claimed in the present Application provides a degree of "antenna shaping" to adjust radiation lobes and directions for providing better coverage of a sub-sector in a wireless communication system. This beneficial aspect of the present invention is disclosed in the Application at Specification page 5, lines 23 – 24: "Antenna controller 115 individually adjusts each narrow beam radiation pattern 405, 406, 407, and 408." Tayloe never suggests any such adjustment of radiation pattern. Tayloe makes no mention or allusion to adjusting any characteristic of antenna radiation. Tayloe's silence regarding any treatment of antenna radiation pattern discounts any applicability of the disclosure of Tayloe in rendering the present invention unpatentable.

Tayloe not only failed to even allude to altering radiation patterns of antennas, when he mentioned a characteristic that could be effectively changed by altering radiation pattern of an antenna (i.e., antenna shaping) he states outright that such changes must be made in the field. That is to say, according to the disclosure of Tayloe, one must dispatch

a worker to the site of the antenna to make such adjustments. In short, in so far as the disclosure of Tayloe (however remotely) can be regarded as relating to the subject matter of the present invention, it teaches away from the present invention.

Bruckert contributes nothing to remedy the shortcomings of Tayloe in relating to the present invention. Bruckert was also cited in the Applicants' IDS in this Application as being prior art related to the subject matter of the present invention. Bruckert is cited by the Examiner as teaching that the location of the mobile station is determined within a subsector of a sector of a cell and uses an antenna structure with a narrower beam width than angular width of the sector. However, Bruckert does not teach, show, disclose, suggest, allude to, infer or in any way render obvious – individually or in any combination with Tayloe - the altering of a radiation pattern of a base station antenna in a wireless communication system to improve performance on a sub-sector basis.

The Examiner continued in the Official Action stating that, regarding Claim 4, Tayloe does not teach the approximate location is the last known location. The Examiner opined that “It is taken official notice that approximating the location of a mobile station based on a last known location is conventionally well known.”

Applicants respectfully object to the Examiner's recitation of some ephemeral, supposedly well known “common knowledge” as a basis for rejecting a Claim. Applicants respectfully request that the Examiner cite a bona fide, relevant prior art reference to substantiate the “official notice” relied upon here. In any event, Claim 4 depends from Claim 1. Applicants believe that Claim 1, as amended, is patentable. It follows, therefore, that Claim 4 is also patentable as it depends from a patentable claim.

The Examiner continued in the Official Action stating that, regarding Claim 5, Tayloe also teaches bit error rate, handover failures (citing Col. 4, lines 51-65 of Tayloe).

Claim 5 depends from Claim 1. Applicants believe that Claim 1, as amended, is patentable. It follows, therefore, that Claim 5 is also patentable as it depends from a patentable claim.

The Examiner continued in the Official Action stating that, regarding Claims 6, 16, Tayloe also teaches altering transmitter power (citing Col. 4, lines 33-36 of Tayloe).

Claims 6 and 16 have been canceled by this Amendment. However, since the limitations of Claims 6 and 16 have been incorporated into amended Claims 1 and 15, respectively, this rejection by the Examiner must be clarified and overcome. Applicants respectfully traverse the Examiner's characterization that any teaching by Tayloe regarding altering transmitter power somehow anticipates, or renders obvious or in any way contributes to rendering obvious the provisions of Claims 6 and 16. As mentioned earlier herein, Tayloe discloses altering various system-level parameters (emphasis provided) to achieve improved performance in a wireless communication system. Tayloe does not teach, show, disclose, suggest, infer or in any way render obvious the altering of a radiation pattern of a base station antenna in a wireless communication system to improve performance on a sub-sector basis. Specifically, Tayloe mentions altering "...various system parameters such as: transmitter power, transmitter frequency, frequency assignments, or software algorithms." [Tayloe, Col. 5, lines 35 – 37]. The limitations of Tayloe are further enumerated by Tayloe: "Hardware specific alterations like: increasing or decreasing antenna height, adding additional base stations, utilizing omni or directional antennae, or varying antenna shaping must be performed in the field." (emphasis provided) [Tayloe, Col. 5, lines 55 – 59] The Examiner is respectfully referred to the earlier discussion of further aspects of this argument. Applicants do not repeat those arguments in full here in order to avoid prolixity.

Of importance and worth mentioning here: Claims 6 and 16 – and the limitations of those claims that are now incorporated in Claims 1 and 15 – do not address altering transmitter power. The claim limitations relate to adjusting antenna radiation pattern. The two parameters are not related, not convertible one to another, and are not substitutes for one another. The two parameters – transmitter power and radiation pattern – are

independent parameters. Adjusting radiation pattern is not in any way disclosed, taught, suggested, or shown in Tayloe. Tayloe in no way contributes to rendering obvious an adjusting of antenna radiation patterns to improve performance of a wireless communication network as performed by the present invention and as presently claimed in the Application.

The Examiner continued in the Official Action stating that, regarding Claims 7 – 12, 17 - 18, Tayloe also teaches updating and modifying the updating (citing Col. 5, line 68 through Col. 6, line 29 of Tayloe).

Claims 7 - 12 ultimately depend from Claim 1. Claims 17 - 18 depend from Claim 15. Applicants believe that Claims 1 and 15, as amended, are both patentable. It follows, therefore, that Claims 7 – 12 and 17 – 18 are also patentable as they depend from patentable claims.

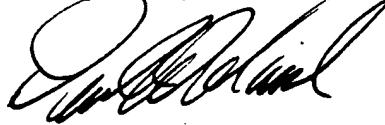
The Examiner continued in the Official Action stating that, regarding Claim 13, Tayloe does not teach the linear antenna array. The Examiner opined that “It is taken official notice that providing a base station with linear antenna array is conventionally well known.”

Applicants would normally respectfully object to the Examiner’s recitation of “common knowledge” as a basis for rejecting a Claim. However, Applicants note that the Specification recites use of linear array antennas as adjustable base station antennas at Page 2, lines 22 – 24. In any event, Claim 13 depends from Claim 1. Applicants believe that Claim 1, as amended, is patentable. It follows, therefore, that Claim 13 is also patentable as it depends from a patentable claim.

In summary, nothing in Tayloe, Bruckert or any other art of record, individually or in any combination teaches, discloses, suggests, shows or in any way renders obvious the present invention as presently claimed.

Since Applicants have fully and completely responded to the Official Action, this Application is now in order for early action and such early action is respectfully requested. If the Examiner would deem a telephone conference to be of value in expediting this Application, he is invited to call the undersigned attorney at (972) 758-1955 at his convenience.

Respectfully submitted,



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I certify that this document is being deposited on April 10, 2002, with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.



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